

FACILITY : 11 DEPT: FES BLDG: E1 690 21577 01
AREA/LOC : OPER/CEMS LWI OPERATOR / CONTINUOUS EMISSIONS WORK ORDER
UNIT : LWI LIQUID WASTE INCINERATOR (690) =====
EQUIPMENT: IWSS0610 CEM ANALYZER DUEL SYSTEM CONT MON 11121577 01
FIN/POS : =====
MANUFACT.: MODEL :
SERIAL NO: SPIN : COST CNTR: 11690
INITIATOR: UHNPDAM PLANNER : UHNPDXC
JOB TYPE : PM PRIORITY: 3 NEED DATE: 12-25-2025

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WORK ORDER STATUS : PLAN
WORK ORDER DESCRIPTION: LWI BI-MONTHLY INTERLOCK CHECK PM (PCS)

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TASK STATUS : PLAN
TASK DESCRIPTION : LWI BI-MONTHLY INTERLOCK CHECK PM (PCS)

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CRAFT STAFF REQUIRED
MSIN 2

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EXPANDED TASK DESCRIPTION:

PERFORM LWI INTERLOCK CK PM BIMONTHLY AS OUTLINED IN	11/05/98 UHNPDAM
PROCEDURE LOCATED IN V-41 INSTRUMENTATION FOREMANS OFFICE.	11/05/98 UHNPDAM
BE SURE TO FILL OUT CHECK SHEET COMPLETELY AND RETURN TO	11/05/98 UHNPDAM
FOREMAN FOR REVIEW.	11/05/98 UHNPDAM
*****	11/05/98 UHNPDAM
COORDINATE WITH OPERATIONS AND OBSERVE STD. ELECTRICAL	11/05/98 UHNPDAM
AND INSTRUMENT SAFETY PRECAUTIONS	11/05/98 UHNPDAM
*****	11/05/98 UHNPDAM

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FIELD SIGN-IN:

EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____

=====

REPLACEMENT:

SPIN : _____ MANUFACT.: _____
MODEL: _____ SERIAL : _____

M121. COMPLETION COMMENTS AND REPAIR RECOMMENDATIONS:

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IS A NEW WORK REQUEST REQUIRED ? (Y/N) ____ NEED BY ____/____/____

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PRINTED: 11-11-1998

PAGE 1

AWFCO TEST
(Automatic Waste Feed Cut Off)

Object: To shut down the residue feed pumps to the burner in the event of a system upset.

Test Materials Required

1. Two-way radio's - located in the South Area Instr. shop
2. Key to Logic Room - located in the LWI Control Room desk
3. Altek test calibrator - located in the Logic Room
4. AWFCO test sheets - located in the Logic Room file cabinet or Instrument Foremans office

Procedure

1. Get signed in by the residue burner operator
2. Operator to have burner on **OIL**, not residue
3. Operator to have residue feed pump manual valves **CLOSED** with pumps drained and drain valves open.
4. Calculate the MA's required for tests 1 through 5 using formula on front page of the AWFCO test sheets. Check with operator for oil feed rate.

Bring AWFCO screen up on the Bailey

- A. Select the key labeled "Utility Overview" - press once
- B. Select the key labeled "H", AWFCO Testing - press once

Once on the AWFCO testing screen, you will have four blocks along the top, one small block in the middle and one large block at the bottom.

1. **SEQ-137 AWFCO TEST CONTROL**: This block, when highlighted (**BLOCK A**) and put in manual and run, will **START** the AWFCO test and SEQ-137E(AWFCO test step timer)
2. **SEQ-137H AWFCO TEST HOLD/LATCH**: This block will **HOLD** testing (**BLOCK B**) stop timer, SEQ-137E. Also when in **HOLD** the interlocks are no longer by-passed.

NOTE* The **HOLD** mode is used when the operator needs to make a change or when you need to suspend the test temporarily.

3. **SEQ-137A AWFCO TEST STEP**: This block is used to step through each (**BLOCK C**) test in sequence, 1 to 11, and 17 to 27. As a test is completed, **SP** will appear and can be acknowledged (yes).
4. **SEQ-137M AWFCO TEST A/M SW.**: This block must be in **MAN** to start (**BLOCK D**) the test. In **AUTO**, the Bailey DCS will simulate the signal inputs.

5. **SEQ-137E AWFCO STEP TIME:** This block times how long each test took to complete. This timer will reset back to 0.00 sec. after each test is ack. "yes" on block C.

6. **SEQ-137 STEP O STOP OR HOLD BLOCK:** Bottom of screen (large block)(BLOCK Q - Y) This block shows all the interlocks by-passed for the particular test. Also the numerical values of high/low alarms and trip point values.

Operation of AWFCO test:

With all conditions of burner reading normal, run SEQ-137, BLOCK A, of AWFCO test.

To run this test you must first hi-lite BLOCK A:

1. Key the letter "A" on key pad, (press "A" then ENTER)
2. Key AUTO/MAN on key pad, (press to change BLOCK "A" to MAN)
3. Press solid square on key pad to change to RUN.

This starts the AWFCO interlock test and timer.

Example of first test, WIC-202

1. Have instrument tech. pull FUSE 62 and terminal block in FT-U67-1 cabinet in Logic Room. Install test jumpers.

Note: Set meter to a normal reading so that a waste feed pump can be started.

2. Have instrument tech. set calculated MA's that you determined from formula provided.

start a pump:

1. Key **Incinerator Waste** button, shown to the right of the Bailey screen on a separate key pad. The **Waste Feed** screen will come on.

This screen shows all 5 pumps used in the tests.

2. To the right or left of each pump on the screen will be an **OLC** number in red. This number when keyed will bring up the **RUN/STOP** block in the lower right of the screen marked with an OXY logo.

Note: When there is only a single digit number, **ENTER** on the keypad must be pressed following the OLC number to bring up the run/stop block for that pump.

3. Start the pump, instruct the Inst. tech. in the Logic Room, to adjust the milliamps to the calculated value at which point the pump stops and observe that the automatic valve closed.
4. When test is completed, instr. tech. will reinstall fuses and terminal blocks.
5. The condition of the burner should return to normal, and **SP** should show on BLOCK "C".

Note: If **NP** is shown, normal conditions of the burner have not been reached.

acknowledge test completion:

1. On AWFCO screen, hi-lite BLOCK "C".
2. Press "yes" on key pad, this will advance the test to the next step.
3. Repeat operation of AWFCO test steps for tests 2 thru 5.

Note: Tests 1 thru 5 are to check each waste feed pump. After these 5 tests are completed, any one of the pumps can be used for the other tests.

How to engage BLOCK "B", the HOLD sequence 137H:

1. Hi-lite BLOCK "B" on the AWFCO screen
2. Press empty block on key pad
3. This will put the test on hold and give the operator full control of the burner with all interlocks operational.

AWFCO TESTS

DATE: _____

CRAFTSMAN: _____
ENGINEER: _____

FOREMAN: _____

**NOTE: TO CONDUCT THE AWFCO TEST, THE BURNER WILL NEED TO BE ON OIL,
AND THE OPERATOR MUST BE ABLE TO START A WASTE FEED PUMP.**

1. THE AWFCO TEST IS CONTROLLED BY SEQUENCE 137. TO ACCESS THIS SEQUENCE, SELECT THE UTILITY OVERVIEW (UTIL OVER) SCREEN, THEN SELECT OPTION "H" FOR AWFCO TESTING.

2. TO BEGIN THE AWFCO TEST, PUT THE "RUN/STOP" TO "RUN". WHENEVER THIS POSITION IS PUT TO "STOP" THE TEST WILL BE RESET TO THE BEGINNING AND MUST BE STARTED OVER.

NEXT PUT THE "RUN/HOLD" TO "RUN". IF THE OPERATOR NEEDS CONTROL OF THE PROCESS, THE TEST CAN BE PUT ON "HOLD". THE TEST CAN RESUME FROM THIS POINT BY SELECTING "RUN".

THE ACK. "YES/NO" STEPS THROUGH THE TEST. AFTER A TEST IS COMPLETED, SELECT "YES". THE PROGRAM WILL AUTOMATICALLY GO TO THE NEXT STEP.

3. FOR TESTS 1 THROUGH 5 THE TOTAL MAXIMUM FEED RATE IS 31 lbs./hr. THE OIL FEED RATE MUST BE SUBTRACTED FROM 31, THE REMAINDER IS THE TRIP POINT SETTING OF THE WASTE FEED BEING TESTED. THE MILLIAMP TRIP PT. IS CALCULATED AS FOLLOWS:

$$MA = (16(31 - \text{OIL FEED IN lbs.})/60) + 4$$

4. THE BAILEY UPDATES THE PROCESS INPUTS APPROXIMATELY ONCE PER MINUTE. THEREFORE IT IS NECESSARY TO MAKE ADJUSTMENTS SLOWLY, NOT OVERSHOOTING THE SET VALUES. THIS IS ESPECIALLY TRUE FOR TRIP PTS. WITH TIME DELAYS. THE START OF TIME DELAYS WILL BE APPROXIMATE DUE TO THE BAILEY.

TEST #1

LOOP NO. WIC-202 - MAXIMUM FEED RATE
FT-U67-1, FUSE 62, SET LOOP CALIB. TO 4 WIRE

VISUALLY VERIFY
VALVE CLOSED
@ TRIP POINT
OK _____

TRIP POINT
31 lbs/hr
%MA =
MA =
OK _____
(1 MIN. TIME DELAY)

TEST #2

LOOP NO. WIC-203 - MAXIMUM FEED RATE
FT-U67-1, FUSE 71, SET LOOP CALIB. TO 4 WIRE

VISUALLY VERIFY
VALVE CLOSED
@ TRIP POINT
OK _____

TRIP POINT
31 lbs/hr
%MA =
MA =
OK _____
(1 MIN. TIME DELAY)

TEST #3

LOOP NO. WIC-204 - MAXIMUM FEED RATE
FT-U67-1, FUSE 72, SET LOOP CALIB. TO 4 WIRE

VISUALLY VERIFY
VALVE CLOSED
@ TRIP POINT
OK _____

TRIP POINT
31 lbs/hr
%MA =
MA =
OK _____
(1 MIN. TIME DELAY)

TEST #4

LOOP NO. WIC-205 - MAXIMUM FEED RATE
FT-U67-1, FUSE 81, SET LOOP CALIB. TO 4 WIRE

VISUALLY VERIFY
VALVE CLOSED
@ TRIP POINT
OK _____

TRIP POINT
31 lbs/hr
%MA =
MA =
OK _____
(1 MIN. TIME DELAY)

TEST #5

LOOP NO. FIC-546 - MAXIMUM FEED RATE
FT-U67-1, FUSE 91, SET LOOP CALIB. TO 4 WIRE

VISUALLY VERIFY
VALVE CLOSED
@ TRIP POINT
OK _____

TRIP POINT
31 lbs/hr
%MA =
MA =
OK _____
(1 MIN. TIME DELAY)

TEST #6LOOP NO. FIC-101 & FIC-201 - MAXIMUM STEAM FEED RATE

FT-U67-1, FUSE 1 OR FUSE 11, SET LOOP CALIB. TO 2 WIRE

SET ONE FLOW TO 600 lbs./hr.HIGH ALARM

1800 lbs/hr

%MA = 64%

MA = 14.24

OK _____

TRIP POINT

1960 lbs/hr

%MA = 87%

MA = 17.9

OK _____

(1 MIN. TIME DELAY)

TEST #7LOOP NO. FIC-210 - MAXIMUM COMBUSTION AIR FLOW RATE

FT-U67-1, FUSE 21, SET LOOP CALIB. TO 2 WIRE

HIGH ALARM

2800 scfm

%MA = 26%

MA = 8.24

OK _____

TRIP POINT

2900 scfm

%MA = 27.8%

MA = 8.5

OK _____

(3 MIN. TIME DELAY)

OPERATOR TO RESET HS-801 BEFORE CONTINUING TEST**TEST #8**LOOP NO. PI-206 - MAXIMUM INCINERATOR BODY PRESSURE

FT-U67-1, FUSE 123, SET LOOP CALIB. TO 2 WIRE

HIGH ALARM

-0.5 "w.c.

%MA = 45%

MA = 11.2

OK _____

TRIP POINT

-0.1 "w.c.

%MA = 49%

MA = 11.85

OK _____

(10 SEC. TIME DELAY)

OPERATOR TO RESET HS-801 BEFORE CONTINUING TEST**TEST #9**LOOP NO. TI-204 - MAXIMUM INCINERATOR EXIT TEMP.

FT-U67-1, FUSE 12, SET LOOP CALIB. TO 2 WIRE

HIGH ALARM

1275 deg.C

%MA = 67.5%

MA = 14.8

OK _____

HIGH TRIP PT.

1375 deg.C

%MA = 77.5%

MA = 16.4

OK _____

(INSTANTANEOUS)

TEST #10LOW ALARM

1225 deg. C

% MA = 62.5 %

MA = 14.0

OK _____

LOW ALARM PT.

1200 deg. C

% MA = 60 %

MA = 13.6

OK _____

OPERATOR TO RESET HS-801 BEFORE CONTINUING TEST

TEST #11 THROUGH #16 ARE NOT USED

TEST #17 LOOP NO. FI-681 - ABSORB./CONDEN. MIN. RECYCLE FLOW
FT-U67-2, FUSE 33, SET LOOP CALIB. TO 4 WIRE

LOW ALARM

800 gpm
% MA = 80%
MA = 16.8
OK _____

TRIP POINT

750 gpm
%MA = 75%
MA = 16.0
OK _____
(10 SEC. TIME DELAY)

OPERATOR TO RESET HS-801 BEFORE CONTINUING TEST

TEST #18 LOOP NO. AIC-664 - ABSORB./CONDEN. MIN. pH
FT-U67-2, FUSE 41, SET LOOP CALIB. TO 2 WIRE

LOW ALARM

7.5 pH
% MA = 53 %
MA = 12.84
OK _____
(1 MIN. TIME DELAY)

TRIPPOINT

7.0pH
% MA = 50 %
MA=12.0
OK _____
(10 MIN. TIME DELAY)

TEST #19 LOOP NO. FI-745 - #1 IWS MIN. RECYCLE FLOW
FT-U67-2, FUSE 64, SET LOOP CALIB. TO 4 WIRE

LOW ALARM

475 gpm
%MA = 63%
MA = 14.07
OK _____

TRIP POINT

450 gpm
%MA = 60%
MA = 13.55
OK _____
(20 SEC. TIME DELAY)

TEST #20 LOOP NO. FI-775 - #2 IWS MIN. RECYCLE FLOW
FT-U67-2, FUSE 73, SET LOOP CALIB. TO 4 WIRE

LOW ALARM

475 gpm
%MA = 63%
MA = 14.07
OK _____

TRIP POINT

450 gpm
%MA = 60%
MA = 13.55
OK _____
(20 SEC. TIME DELAY)

TEST #21 LOOP NO. TI-626 - QUENCH MAXIMUM EXIT TEMP.

FT-U67-2, FUSE 22, SET LOOP CALIB. TO 2 WIRE

HIGH ALARM

93 deg.C
%MA = 80.71 %
MA = 16.91
OK _____

TRIP POINT

95 deg.C
%MA = 82.14 %
MA = 17.14
OK _____
(INSTANTANEOUS)

OPERATOR TO RESET HS-800, THEN RESET HS-801

TEST #22 LOOP NO. EI-721B - #1 IWS LOW VOLTAGE

FT-U67-2, FUSE 124, SET LOOP CALIB. TO 2 WIRE

LOW ALARM

19 KVDC
%MA = 47.5%
MA = 11.6
OK _____

TRIP POINT

18 KVDC
%MA = 44.2%
MA = 11.07
OK _____
(6 MIN. TIME DELAY)

TEST #23 LOOP NO. EI-751B - #2 IWS LOW VOLTAGE

FT-U67-2, FUSE 134, SET LOOP CALIB. TO 2 WIRE

LOW ALARM

19 KVDC
%MA = 47.5%
MA = 11.6

OK _____

TRIP POINT

18 KVDC
%MA = 44.2%
MA = 11.07

OK _____
(6 MIN. TIME DELAY)

TEST #24 LOOP NO. EI-721B/751B - #1 & #2 IWS SIMULT. LOW VOLTAGE

FTC-2, FUSE 124 & 134 SET 2 LOOP CALIB. TO 2 WIRE

SET ONE SIMULATOR AT 11.02 MA ON FUSE 134 , THEN PULL
FUSE 124 TO GET INSTANTANEOUS TRIP.

TRIP POINT

18 KVDC
%MA = 44.2%
MA = 11.02
OK _____
(INSTANTANEOUS)

TEST #25

LOOP NO. AI-424 - CEMS MAXIMUM CHLORINE
FT-U67-2, FUSE 144, SET LOOP CALIB. TO 4 WIRE
HIGH ALARM

30 ppmv
%MA = 46%
MA = 11.25
OK _____

TRIP POINT

50 ppmv
%MA = 68.5%
MA = 14.96
OK _____
(5 MIN. TIME DELAY)

OPERATOR TO RESTART IWS UNITS 1 & 2 BEFORE CONTINUING TEST

TEST #26

LOOP NO. AI-443 - CEMS MINIMUM OXYGEN
FT-U67-2, FUSE 143, SET LOOP CALIB. TO 4 WIRE
SET CALIBRATOR TO 12 MA BEFORE STARTING TEST

HIGH ALARM

13 %
%MA = 51.0 %
MA = 12.16
OK _____

HI HI ALARM

14.0 %
%MA = 55 %
MA = 12.8
OK _____

LOW ALARM

9.0 %
% MA = 38.3 %
MA = 10.13
OK _____

TRIP POINT

7.0 %
% MA = 31.0 %
MA = 9.03
OK _____
(3 MIN. TIME DELAY)

TEST #27

LOOP NO. AI-442B - CEMS MAXIMUM AVERAGE CO
FT-U67-2, FUSE 142, SET 2 LOOP CALIB. TO 4 WIRE
HIGH ALARM

30 ppmv
%MA = 20.8%
MA = 7.33
OK _____

TRIP POINT

50 ppmv
%MA = 29.2%
MA = 8.67
OK _____
(1 MIN. ROLLING AVERAGE)

OPERATOR TO RESTART IWS UNITS 1&2BEFORE CONTINUING TEST

TEST #28

LOOP NO. PI-303 - INCINERATOR AIR PRESSURE
FT-U67-1, FUSE 3, SET 2 LOOP CALIB. TO 2 WIRE
LOW ALARM

75 PSI
%MA = 75%
MA = 16.0
OK _____

TRIP POINT

70 PSI
%MA = 70.0%
MA = 15.2
OK _____

OPERATOR TO RESTART IWS UNITS 1 & 2 BEFORE ENDING TEST

FACILITY : 11 DEPT: FES BLDG: E1 690 21566 01
AREA/LOC : OPER/CEMS LWI OPERATOR / CONTINUOUS EMISSIONS WORK ORDER
UNIT : LWI LIQUID WASTE INCINERATOR (690) =====
EQUIPMENT: IWSS0610 CEM ANALYZER DUEL SYSTEM CONT MON 11121566 01
FIN/POS : =====
MANUFACT.: MODEL :
SERIAL NO: SPIN : COST CNTR: 11690
INITIATOR: UHNPDAM PLANNER : UHNPDXC
JOB TYPE : PM PRIORITY: 3 NEED DATE: 12-25-2025

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WORK ORDER STATUS : PLAN
WORK ORDER DESCRIPTION: LWI QUARTERLY PM

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TASK STATUS : PLAN
TASK DESCRIPTION : LWI QUARTERLY PM (PCS)

=====

CRAFT STAFF REQUIRED
MSIN 2

=====

EXPANDED TASK DESCRIPTION:

PERFORM LWI QRTLY PM OUTLINED IN PROCEDURE	10/20/98 UHNPDAM
LOCATED IN V-41 INSTRUMENTATION FOREMAN OFFICE. BE SURE	10/20/98 UHNPDAM
TO FILL OUT CHECK SHEET COMPLETELY AND RETURN TO FOREMAN FO	11/05/98 UHNPDAM
R REVIEW.	11/05/98 UHNPDAM
*****	11/05/98 UHNPDAM
COORDINATE WITH OPERATIONS AND OBSERVE STD. ELECTRICAL	11/05/98 UHNPDAM
AND INSTRUMENT SAFETY PRECAUTIONS	11/05/98 UHNPDAM
*****	11/05/98 UHNPDAM

=====

FIELD SIGN-IN:

EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
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EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____

=====

REPLACEMENT:

SPIN : _____ MANUFACT.: _____
MODEL: _____ SERIAL : _____

M121. COMPLETION COMMENTS AND REPAIR RECOMMENDATIONS:

=====

IS A NEW WORK REQUEST REQUIRED ? (Y/N) ____ NEED BY ____/____/____

=====

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LWI QUARTERLY PM & CHECK SHEET

CEMQRTLYb.DOC

SAFETY PRECAUTIONS:

____ Wear proper PPE

____ Before any electrical or mechanical equipment is worked on ensure all energy sources associated with the equipment under repair is properly locked out by all maintenance personnel involved in the job.

COORDINATION:

____ Ensure coordination with operations to minimize process upsets and to to have operations sign in on the work order.

PROCEDURE:

PRESSURE TRANSMITTERS

REFERENCE: LWI QA/QC PLAN , PRESSURE TRANSMITTER INSTRUCTION MANUAL

____ Remove the following gauge pressure transmitters from service.
(PIT-651)

____ Using a standard pressure calibrator, generate pressure signals corresponding to the low, mid, and high calibration values, and compare to transmitters. Adjust as necessary.

TEMPERATURE TRANSMITTERS

REFEERENCE: LWI QA/QC PLAN, TEMPERATURE TRANSMITTER INSTRUCTION MANUAL

____ Remove thermocouple and transmitter from service.
(TE/TT-626)

____ Check & replace if necessary, Te-626 with stores item number 11-37133206.
Inspect wiring etc.

CRAFTSMAN _____

DATE _____

SUPERVISOR _____

DATE _____

500057
LOOP CALIBRATION REPORT SHEET ____ OF ____

*** see glossary on reverse side *** *** attach more sheets if needed ***

DATE _____ Signature of: APPROVALS
CRAFTSMAN _____ FOREMAN _____
_____ ENGINEER _____
AREA LWI SUPERINTENDENT _____

=====

LOOP INFORMATION

LOOP NUMBER PIT-651 LOOP NAME ABS/COND. NOZ. PRESS. EQUIP. # 1272078

<u>TRANSMITTER INPUT</u> (<u>"h20, psi</u> , mv, other)		<u>TRANSMITTER OUTPUT</u> (<u>ma</u> , psig, other)		<u>SCALE RANGE</u> (controllers, recorders) (engineering units)	If Temp. Transmitter	
zero	<u>0.0</u>	zero	<u>4.0</u>	zero	<u>0.0 PSIG</u>	junc. type _____
mid	<u>25.0</u>	mid	<u>12.0</u>	mid	<u>25 PSIG</u>	amb. tmp. _____
span	<u>50.0</u>	span	<u>20.0</u>	span	<u>50 PSIG</u>	amb. mv. _____

=====

VISUAL - FOR LEAKS OR DAMAGE

(enter comments for 'NOT OK' or 'CORRECTED')	<u>OK</u>	<u>NOT OK</u>	<u>CORRECTED?</u>	
			<u>YES</u>	<u>NO</u>
TRANSMITTER _____	_____	_____	_____	_____
IMPULSE LINES _____	_____	_____	_____	_____
INDICATOR AND DEVICES _____	_____	_____	_____	_____
OTHER _____	_____	_____	_____	_____

=====

CALIBRATION of TRANSMITTER

<u>INPUT</u>	<u>OUTPUT</u> AS FOUND AS LEFT	
zero _____	_____	_____
mid _____	_____	_____
span _____	_____	_____

CALIBRATION of OTHER LOOP DEVICES
(use engineering units)

name _____		name _____		name _____	
FOUND	LEFT	FOUND	LEFT	FOUND	LEFT
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

=====

COMMENTS _____

_____ (cont. on back)

DATE ON OLD CALIBRATION STICKER ATTACHED TO TRANSMITTER/DEVICE _____

DATE ON NEW CALIBRATION STICKER YOU ARE ATTACHING TO TRANSM/DEVICE _____

=====

CALIBRATION EQUIPMENT DOCUMENTATION

ITEM	MODEL NO.	SERIAL NO.	CALIBR. DATE
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S
19

500057
LOOP CALIBRATION REPORT SHEET ____ OF ____

*** see glossary on reverse side *** *** attach more sheets if needed ***

DATE _____ Signature of: APPROVALS
CRAFTSMAN _____ FOREMAN _____
_____ ENGINEER _____
AREA LWI SUPERINTENDENT _____

=====

LOOP INFORMATION

LOOP NUMBER TT-626 LOOP NAME QUENCH EXIT TEMP. EQUIP. # 1271021

TRANSMITTER <u>INPUT</u> ("h20, psi, (mv), other)		TRANSMITTER <u>OUTPUT</u> ((ma), psig, other)		SCALE RANGE (controllers, recorders) (engineering units)	If Temp. Transmitter		
zero	<u>-0.995 (-20°C)</u>	zero	<u>4.0</u>	zero	<u>-20°C</u>	junc. type	<u>J</u>
mid	<u>2.585 (50°C)</u>	mid	<u>12.0</u>	mid	<u>50°C</u>	amb. tmp.	_____
span	<u>6.359 (120°C)</u>	span	<u>20.0</u>	span	<u>120°C</u>	amb. mv.	_____

=====

VISUAL - FOR LEAKS OR DAMAGE
(enter comments for 'NOT OK'
or 'CORRECTED')

OK	NOT OK	CORRECTED?	
		YES	NO

TRANSMITTER	_____	_____	_____	_____
IMPULSE LINES	_____	_____	_____	_____
INDICATOR AND DEVICES	_____	_____	_____	_____
OTHER	_____	_____	_____	_____

=====

CALIBRATION of TRANSMITTER

<u>INPUT</u>	<u>OUTPUT</u> AS FOUND AS LEFT		
--------------	-----------------------------------	--	--

zero	_____	_____	_____
mid	_____	_____	_____
span	_____	_____	_____

CALIBRATION of OTHER LOOP DEVICES
(use engineering units)

name		name		name	
FOUND	LEFT	FOUND	LEFT	FOUND	LEFT

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

=====

COMMENTS _____

(cont. on back)

DATE ON OLD CALIBRATION STICKER ATTACHED TO TRANSMITTER/DEVICE _____
DATE ON NEW CALIBRATION STICKER YOU ARE ATTACHING TO TRANSM/DEVICE _____

=====

CALIBRATION EQUIPMENT DOCUMENTATION

ITEM	MODEL NO.	SERIAL NO.	CALIBR. DATE
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FACILITY : 11 DEPT: FES BLDG: E1 690 21567 01
AREA/LOC : OPER/CEMS LWI OPERATOR / CONTINUOUS EMISSIONS WORK ORDER
UNIT : LWI LIQUID WASTE INCINERATOR (690) =====
EQUIPMENT: IWSS0610 CEM ANALYZER DUEL SYSTEM CONT MON 11121567 01
FIN/POS : =====
MANUFACT.: MODEL :
SERIAL NO: SPIN : COST CNTR: 11690
INITIATOR: UHNPDAM PLANNER : UHNPDXC
JOB TYPE : PM PRIORITY: 3 NEED DATE: 12-25-2025

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WORK ORDER STATUS : PLAN
WORK ORDER DESCRIPTION: CEM SEMIANNUAL PM

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TASK STATUS : PLAN
TASK DESCRIPTION : CEM SEMIANNUAL PM (PCS)

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CRAFT STAFF REQUIRED
MSIN 1

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EXPANDED TASK DESCRIPTION:

PERFORM CEM SEMIANNUAL PM AS OUTLINED IN PROCEDURE	11/05/98 UHNPDAM
LOCATED IN V-41 INSTRUMENTATION FOREMAN OFFICE. BE SURE	10/20/98 UHNPDAM
TO FILL OUT CHECK SHEET COMPLETELY AND RETURN TO FOREMAN	11/05/98 UHNPDAM
REVIEW.	11/05/98 UHNPDAM
*****	11/05/98 UHNPDAM
COORDINATE WITH OPERATIONS AND OBSERVE STD. ELECTRICAL	11/05/98 UHNPDAM
AND INSTRUMENT SAFETY PRECAUTIONS	11/05/98 UHNPDAM
*****	11/05/98 UHNPDAM

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FIELD SIGN-IN:

EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME IN	:	_____
EQUIP.OWNER'S INITIALS	:	_____	DATE/TIME OUT	:	_____

=====

REPLACEMENT:

SPIN : _____ MANUFACT.: _____
MODEL: _____ SERIAL : _____

M121. COMPLETION COMMENTS AND REPAIR RECOMMENDATIONS:

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IS A NEW WORK REQUEST REQUIRED ? (Y/N) ____ NEED BY __/__/__

=====

PRINTED: 11-11-1998

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CEM SEMI ANNUAL PM & CHECK SHEET

CEMSEMIANN.DOC

SAFETY PRECAUTIONS:

- _____ Wear proper PPE
- _____ Before any electrical or mechanical equipment is worked on ensure all energy sources associated with the equipment under repair is properly locked out by all maintenance personnel involved in the job.

COORDINATION:

- _____ Ensure coordination with operations to minimize process upsets and to have operations sign in on the work order.

PROCEDURE:

ANALYZERS

REFERENCE: LWI QA/QC PLAN, MAIHAK AND AMETEK ANALYZERS INSTRUCTION MANUALS

- _____ Work with service reps. As coordinated by I/E maintenance engineer to accomplish normal maintenance on the following analyzers.(AE/AIT-421,-422,-423,-424,-431,-432,-433,-434)

PRINTER RIBBONS

REFERENCE: Panasonic instruction manual located in cem room.

- _____ Using the panasonic manual replace the printer ribbons in the data acquisition printers in the cem room.

SAMPLE AND PARASTALTIC PUMPS

REFERENCE: Mini Dia-Vac instruction manual, maint. And disassembly page 1 &2.

Located in the CEM operations manual.

- _____ Obtain diaphragm pump repair kit (stores item 11-32880755)
- _____ One at a time using the sample pump instruction manual, replace the diaphragm and valves in the CEM sample pumps, then reset all system pressures and flows according to the CEM system manual.
- _____ Obtain parastaltic pump tube (store item 11-32880802)
- _____ One at a time , replace the tube in the CEM condensate drain pumps.

FILTER REPLACEMENTS

- _____ Obtain filter element (stores item 11-)Before vacuum pump filter.
- _____ Obtain coalescing filter element (stores item 11-)Before condensate monitor filter.
- _____ Replace the filter elements in the filters located before the system vacuum pump, and after the system sample cooler but before the condensate monitor.

CRAFTSMAN _____
SUPERVISOR _____

DATE _____
DATE _____

LWI/CEM ANNUAL PM & CHECK SHEET

CEMYEARb.DOC

SAFETY PRECAUTIONS:

- ☐ Wear proper PPE
- ☐ Before any electrical or mechanical equipment is worked on ensure all energy sources associated with the equipment under repair is properly locked out by all maintenance personnel involved in the job.

COORDINATION:

- ☐ Ensure coordination with operations to minimize process upsets and to to have operations sign in on the work order.

MASS FLOW TRANSMITTERS

REFERENCE: LWI QA/QC PLAN, MICROMOTION EQUIPMENT MANUALS

- ☐ Remove mass flow meter from service.
- ☐ Perform zero procedure on the following coriolis mass flow meters.
(WE/WIT-201,-202,-203,-204,-205, FE/FIT-546)
- ☐ Perform flow test on sensors and transmitters. Use shop test stand, flow water through sensor, weigh mass of water, compare measured mass of water with transmitter signal and adjust transmitter constants as necessary to match the two readings.
(USE MICROMOTION FLOW AND DENSITY CAL FORMS)

TEMPERATURE TRANSMITTERS

REFERENCE: LWI QA/QC PLAN, TEMPERATURE TRANSMITTER INSTRUCTION MANUAL

- ☐ Remove thermocouple and transmitters from service, check cal of txmtrs.
(TE/TT-203,-203A,-204,-626)
- ☐ Replace Te-626 with stores item number 11-37133206. Inspect wiring etc.
- ☐ Replace Te-203,-203a,-204 with T/C from stores. (11-34017003 24" OR 11-34017402 30")

PRESSURE TRANSMITTERS

REFERENCE: LWI QA/QC PLAN , PRESSURE TRANSMITTER INSTRUCTION MANUAL

- ☐ Remove the following gauge pressure transmitters from service.
(PIT-303)
- ☐ Using a standard pressure calibrator, generate pressure signals corresponding to the low, mid, and high calibration values, and compare to transmitters. Adjust as necessary.

ORIFICE PLATES

REFERENCE: LWI QA/QC PLAN

____ Remove the following orifice plates from service.
(FE-101,-201)

____ Inspect for wear. Measure orifice bore (1.0" +/- 0.0014"), and replace as necessary.
If ok clean and reinstall.

MAGMETERS

REFERENCE: LWI QA/QC PLAN, MAGNETIC FLOW TRANSMITTER
INSTRUCTION MANUAL

____ Remove the following magmeters from service. Clean the flow tube, inspect the probes.(FE/FIT-321,-322,-681,-745,-775)

____ Using the manufacturers signal/calibration simulator, generate signals corresponding to low,mid, high range values, and compare to transmitter response. Adjust as required.

VOLTAGE TRANSMITTER

REFERENCE: LWI QA/QC PLAN, VOLTAGE TRANSMITTER INSTRUCTION
MANUAL

____ For the following Voltage Transmitters(ET-721,-751)

____ Using a standard current calibrator, generate signals corresponding to low, mid, and high range values, and compare to transmitter response. Adjust as required.

AVERAGING PITOT TUBE

REFERENCE: LWI QA/QC PLAN

____ Remove the Averaging Pitot Tube (FE-210) from service.

____ Inspect tubes for wear, clean and reinstall.

PLC BATTERIES

REFERENCE: Siemens PLC manual, located in logic room, pg. 3-20

CAUTION: THIS PROCEDURE MUST BE DONE WHILE THE PLC IS POWERED UP. IF POWER LOSS OCCURS WHILE THE BATTERY IS REMOVED FROM THE PLC , PROGRAM MEMORY WILL BE LOST AND THE PROGRAM WILL HAVE TO BE RELOADED.

____ Obtain replacement PLC batteries from stores (item 11-30149608).

____ At the offline system. Open the sample cabinet, then at the PLC processor lift off the processor plastic cover.

____ Remove the existing battery from the processor and unplug it.

NOTE: AT THIS POINT THE BATTERY LED ON THE PROCESSOR WILL GO ON INDICATING LOW BATTERY. THIS IS NORMAL AND THE LED WILL EXTINGUISH WHEN THE NEW BATTERY IS INSTALLED.

____ Install the new battery, and replace the processor cover.

____ Ensure the PLC battery LED is out, indicating the new battery is ok.

____ Repeat for online system.

____ Follow PLC MEMORY Cartridge battery replacement procedure attached.

SAMPLE PROBE FILTERS

REFERENCE: CEM OPERATIONS ANNUAL

_____ Obtain 2 sample probe filters and o ring seals(11-35198632, 11-35198662, 11-35198664)

_____ Pull the probes one at a time at the top of the stack, replace each filter cartridge, and reinstall the probes.

_____ Perform sample line integrity check to ensure no system leaks.

MAIN N2 FILTER

_____ Replace the main N2 filter cartridge located in the CEM shelter upper South East corner of the shelter, near the door.

NOVA CO ANALYZER

REFERENCE: NOVA MODEL 7401S INSTRUCTION MANUAL

SAFETY PRECAUTIONS:

_____ Wear proper PPE, cl2, hcl, and pcbtc, are associated with these vessels.

_____ Before any electrical or mechanical equipment is worked on ensure all energy sources associated with the vessel and lamp under repair is properly locked out by all maintenance personnel involved in the job.

PROCEDURE:

ANNUALY:

_____ Replace the jet in the steam eductor P/N 11-30150011.

_____ Check and Replace if necessary, the lamps in the low water and low sample indicators on the front of the analyzer

_____ Replace the water flow regulator orifice in the water supply piping inside the cabinet. It is held in place by a conduit clamp on the inside of the cabinet lower left wall. Manuf. P/N 7401-GA-25 item is currently being put into stores. Order on procurement card 25\$ from NOVA at 285-0418.

CRAFTSMAN _____

DATE _____

SUPERVISOR _____

DATE _____

PLC MEMORY CARTRIDGE BATTERY REMOVE/REPLACE PROCEDURE

1. Go to system pc.
2. Hit F1 to exit CEM application
3. Hit enter @ password prompt
4. @ DOS prompt type cd\ to get to root directory
5. Type PLC to get to plc environment on computer, at the prompt reboot the computer by pressing cntrl-alt-del
6. @ the Tisoft plc software prompt go online, then press F8 for occident program
7. Using aux functions, do a compare of plc vs disk. Check all categories yes and start the compare. (There should only be 6 mismatches for ladder and register values, this is ok as these are clock ladder and register instructions that change as the time changes)
8. You may at this point do a save all aux function to pull the program from the plc to the pc as a safe practice before removing the cmos ram memory cartridge.
9. Exit out to Tisoft opening screen.
10. @ the CEM sample control panel place Auto/man switch to Man.
11. @ PLC place keysw. To Stop.
12. Pull fuse 4 at the fuseboard in the PLC cabinet to power down the PLC.
13. Pull off processor front cover and remove the CMOS Memory cartridge. (ref. 4.4.2 pg 4-15 of siemens manual)
14. Remove and Replace the Cartridge Battery (ref. Sec. 3.9.2 pg. 3-21 of siemens manual)
15. Replace memory cartridge(ref. Sec. 4.4.1 page 4-13 of siemens manual).
16. Replace power fuse 4, and turn keyswitch from stop to run then term.
17. @ the PC go back online with the PLC and using the Aux. Functions again do a compare of plc to disk to verify that you did not lose the ladder memory.(The memory cartridge has a capacitor to retain memory for a few minutes until the battery is replaced)
18. If you get more mismatches than before replacing the battery use the Aux. Functions to Load All back to the PLC from the PC.
19. Exit TISOFT
20. @the DOS prompt type cd\ to get back to the root directory
21. Type CEM to switch to data acquisition environment in the PC and again reboot the PC with cntrl-alt-del
22. Do an 18 minute auto cal. On the analyzers to clear the report pass/fail indications. After the 1st 18 min. cal. You will see all fails on the PC screen. This will clear the next time the unit goes into auto cal.
23. Wait until the CO rolling ave. comes down, have the operators switch the systems.
24. Repeat 1-23 above on the 2nd system.
25. Leave the CEM configuration as you found it when done so operations can properly switch systems for normal calibration of the systems.